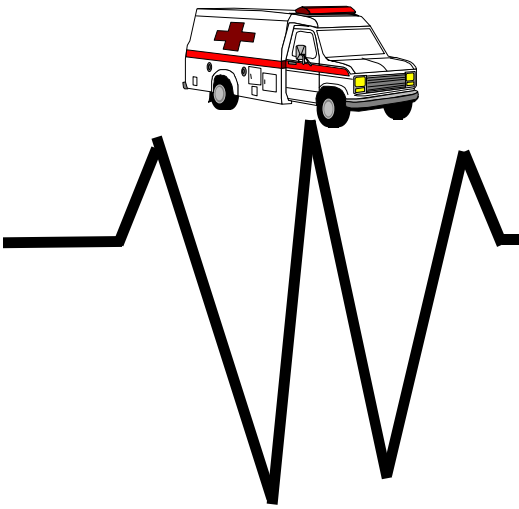

The Problem

Why Worry About Transportation Disruptions Following Future Earthquakes in the San Francisco Bay Area ?

We are speeding toward a major transportation disaster in the Bay Area. It is essential that all of us – as employers, residents, parents, utilities, and transportation providers – reexamine what are travel plans will and should be following a major earthquake. Our basic health and well-being following the earthquake, as well as the long-term economic health of the Bay Area, are at stake.

How *BAD* Do We Think It Will Be?

The following table summarizes the extent of the problem.

TABLE 1: Predicted Road Closures for Bay Area Counties and Selected Earthquake Scenarios

County Data for Earthquake Scenarios	Alameda	Contra Costa	Marin	Napa	San Francisco	San Mateo	Santa Clara	Solano	Sonoma	TOTAL
Peninsula Segment of San Andreas	53	4	18	0	87	166	112	0	1	442
Peninsula-Golden Gate Segment of San Andreas	55	7	27	0	358	260	117	0	3	828
San Gregorio	30	4	19	0	56	105	9	1	2	224
Northern Hayward	606	236	40	2	85	9	12	9	12	1,010
Southern Hayward	685	38	27	1	56	9	69	7	5	896
Entire Hayward	980	256	44	3	231	16	78	12	17	1,639
Healdsburg-Rodgers Creek	56	27	36	4	52	3	2	9	207	397
Maacama	9	3	2	2	6	1	1	1	53	79
West Napa	25	23	2	78	7	1	1	16	6	159
Concord-Green Valley	67	193	2	17	12	3	8	82	5	389
Northern Calaveras	171	91	2	1	10	3	25	8	1	311
Greenville	67	36	2	0	7	1	7	10	1	132

It is important to note the huge number of predicted road closures if the entire Hayward, northern Hayward, southern Hayward, or Peninsula-Golden Gate San Andreas earthquake scenarios occur relative to the other eight scenarios.

In addition, note that these numbers do not include:

- secondary disasters (such as huge fires, toxic gas releases far larger than Northridge or Loma Prieta, or dam collapse);
- possible road closures created to locate emergency housing; or
- extensive ground failures due to ground saturation associated with a very large winter storm.

How Did We Develop Our Estimates?

In October 1997, ABAG estimated the number of road and rail closures resulting from several scenario earthquakes likely to occur in the Bay Area ***(Riding Out Future Quakes***, Perkins and others, 1997). These scenarios were based on an extensive statistical analysis of the number and types of closures to roads which occurred as a result of the 1989 Loma Prieta and 1994 Northridge earthquakes. We found that road closures in both earthquakes have similar direct and indirect causes.

Additional information on the causes of these closures, as well as maps of the density of closures, are available in the 1997 ***Riding Out Future Quakes Report*** (Perkins and others) and on the ABAG Earthquake Program Internet site at http://quake.abag.ca.gov.

Note that the Peninsula-Golden Gate Segment of the San Andreas fault was not included in the 1997 report. It is included at this time to reflect the ground shaking information discussed in ABAG's ***On Shaky Ground – Supplement*** (Perkins, 1998). Additional information on the effects of an earthquake on this fault on transportation was developed for these subregional workshops and is included in ***Appendix A***.

A possible earthquake on the Monte Vista fault was also discussed in that ***Supplement***. This earthquake would result in from 200 - 400 road closures, depending on the damage caused by surface fault rupture. Additional information on this fault, which is part of the Foothills thrust fault system, was provided by Keith Kelson of William Lettis & Associates at one of the subregional workshops. The information is summarized in ***Appendix B***.

Why Are Our Estimates Are Slightly *LARGER* Than in 1997?

Even though they were issued in October 1997, they were based on the October 1996 status of the Caltrans state and federal highway structure retrofit program. We expected that two years of retrofit work would make the number of roads closed due to structural damage to bridges and interchanges smaller. These numbers did drop. However, the "average" structural "health" of the ***local*** bridges and other elevated structures, including the BART system, was found by the Structures staff of Caltrans to be lower than estimated in October 1996. Thus, incorporating the additional information on these local structures has meant that the total estimated number of closures is larger.